Space Weather Forecast

Issued on Tuesday, 16 August 2022 at 01:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor Geomagnetic Storms likely from day 2 (17th). Moderate flares (R1-R2 Radio blackouts) likely throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is Moderate, with frequent Common-class flares and in recent hours there have been four Moderate-class flares. There are currently five numbered sunspot regions on the visible disc. Some of these are of interest displaying relatively complex magnetic structure. A Coronal Mass Ejection (CME) that occurred from the northwest quadrant at 14/1200 UTC has been analysed and is forecast to impact Earth on day 2 (17 Aug). Another CME occurred from a filament eruption in the southwest quadrant at around 15/0500 UTC, and this will also arrive on the same day. There is also potential or yet another CME to impact Earth resulting from one of the Moderate-class flares that peaked at 15/1436 UTC but this appears to have a significant southward component that may miss Earth and carries a lower confidence for arrival at Earth.

Solar Wind / Geomagnetic Activity: The solar wind is slightly elevated with levels declining to around 450km/s. The total magnetic field was weak throughout with only weak variations in the important north-south component. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be moderate and currently there is a chance (15%) for activity to become High if there are any strong flares over the coming days. The most likely source region for a strong flare would be from the developing sunspot region which is near centre disc in the southern hemisphere.

Solar Wind / Geomagnetic Activity: Solar winds are likely to decline further to reach Slow levels over the next 24 hours. On day 2 (17th), Earth is expected to connect with the fast winds from a coronal hole. This enhancement is likely to be further enhanced by at least one CME, which is forecast to impact Earth around the same time frame. Geomagnetic activity is expected to be Quiet, with isolated Unsettled intervals on day 1 (16th). On days 2 and 3 (17th and 18th), activity is expected to become Unsettled to Active, and Minor Geomagnetic Storm intervals are likely. There is also a chance of a Moderate Geomagnetic Storm in association with the CME arrivals.

Energetic Particles / Solar Radiation: Solar radiation storms are unlikely, but there is a slight chance of an S1 or greater event due to the more complex regions on the visible side of the solar disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	60	40	20
Strong	G3	No	1	20	10	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	70	70	60
Very Active	R3 to R5 X	No	15	20	20	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	15	20
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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